REMARKS

The Examiner has rejected claims 1-2, 9, 20-23 and 26 under 35 U.S.C. § 102(b) as being anticipated by Tanaka et al. U.S. Patent No. 5,361,968. Claims 5-8 and 25 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tanaka et al. Claims 3-4, 10-12, 24 and 27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tanaka et al. in view of Murphy et al. ("The Rapid Manufacture of Metallic Components by Laser Surface Cladding").

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version with Markings to Show Changes Made." Also attached hereto is a clean copy of all claims now pending in this application.

The specification has been amended to correct a typographical error on page 1, line 13. Patent No. 4,608,895, which was the patent intended to be incorporated, is referenced on page 12, line 10, and so it is believed that no new matter is added by this amendment.

The specification has been amended at page 12, line 3 to insert the sentence "These materials, by definition, include carbides, and are compositionally different and of greater hardness than base materials such as medium carbon plain steels or medium carbon low alloy steels." The die body materials were listed on page 11, lines 17-19. On page 11, lines 20-21, the application then states that "In contrast, the material which is preferably introduced in powder form, to form the blade 14, may be of another material selected based on the desired parameters of the die blade." These other materials are listed on page 12, lines 1-3. The sentence added to the specification is merely clarifying that "another material" would, by definition, be compositionally different. Further, because it was specified that these other materials are selected based on desired die blade parameters, and the specification makes clear that blades

require harder materials, then the blade material is harder than the die body material. For example, on page 8, line 2, the blade parameters are stated as being "hardness and life," and on page 16, lines 5-11, the blades of the present invention are described as being of "exceedingly hard material" as compared to the "softer blades" of the prior art. Thus, no new matter is believed to be added by this amendment.

The specification has been amended at page 12, line 11 to insert the sentence "Patent No. 4,608,895 also depicts blades that meet or intersect each other, which as stated above, was a problem with prior procedures." The '895 patent was incorporated by reference, and so this addition does not constitute new matter. The sentence also refers back to page 5, lines 4-7, where Applicant discusses prior art difficulties that occur due to intersecting blades, which are often a feature of rotary cutting dies.

The specification has been amended at page 13, line 14 to insert the statement that the optional heat treating steps for strengthening the blade may be unnecessary "because the high quality steel can inherently provide a hardness equivalent to the final desired hardness of the blade." This statement is added for purposes of clarification, and is not believed to constitute new matter.

Claim 23 has been canceled, new claims 28-29 have been added, and independent claims 1, 20, 21 and 22 have been amended to include that the surface of the die body is heated with a laser and the blade material is deposited onto the heated die surface to build a blade outwardly from the surface. Pending claims 2-12 and 24-29 each depend directly or indirectly from one of the amended independent claims 1, 20, 21 and 22, and so also include that the blade material is deposited onto the die surface heated with a laser to build a blade outwardly from the

surface. Tanaka et al. do not teach or suggest use of a laser, and thus there can be no anticipation of the claims as amended. Thus, the rejection of claims 1-2, 9, 20-22 and 26 under § 102 over Tanaka et al. is believed to be overcome by the present amendment.

With respect to the rejection of claims under § 103 over Tanaka et al. in view of Murphy et al., the independent claims 1, 20, 21 and 22 have also been amended to specify that the blade is built from a material having a composition different than that of the die body surface and a hardness greater than that of the die body surface. Support for these amendments may be found at page 11, line 17 to page 12, line 3; page 8, line 2; page 16, lines 5-11; and the amendment to page 12, line 3. Applicant submits that the claims, as amended, are not obvious over the combination of Tanaka et al. and Murphy.

Tanaka et al., in the background of the invention (col. 1), discuss the prior art that led up to their development regarding trimming blades for metallic press dies. Tanaka et al. first describe the need for the finished blade to be harder than the bulk of the die. The die is a plate-like workpiece in which the trimming blade is in the form of an edge portion of the plate. (col. 1, lines 1-15) To accomplish the hard edge portion, the die would be formed of a single low hardness base material, and the edge portion to be used as the trimming blade would subsequently be quenched by heat treatment. (col. 1, lines 17-23) This method was found unacceptable due to either the occurrence of quench cracks or the inability to raise the hardness of the base material to a hardness sufficient for use as a trimming blade. (col. 1, lines 23-29)

Tanaka et al. then described, again in the background of the invention (col. 1, lines 30-36), the solution of removing the edge portion of the press die to form a chamfered surface and welding a hard material onto the base material. This welded material, however, then

required significant machining to shape and define the corner trimming blade. Due to the hardness of the welded material, and its bulk beyond a near net shape, machining was difficult and limited to grinding techniques. Milling was not possible. (col. 1, lines 41-52) This process, nonetheless, has been in use for over a hundred years.

Tanaka et al. thus addressed the problem of needing to form hard trimming edges on metallic press dies wherein the blade portion was amenable to substantial machining, yet could be made hard enough to function as a trimming blade.

Tanaka et al. proposed a process similar to the conventional hard material welding process, but instead welded a soft material onto the soft base material that could, after machining, be cryogenically treated to raise the hardness high enough to be suitable for trimming blade use. Machining was then possible by a broader range of techniques due to the softness of the material after welding. In the as-deposited or as-welded state, the blade material contains austenite and has a martensitic transformation starting temperature (Ms) below 150°C. The cryogenic treatment effectively converts austenite in the welded material to the harder martensite phase. Various compositional elements are described, and it is suggested that very strict control of the composition must be maintained to ensure that the Ms temperature remains low. Thus, martensite transformation is the effective means in Tanaka et al. for obtaining the requisite hardness for use in trimming applications.

The problem that the present applicants recognized with the method proposed by Tanaka et al., as well as prior welding techniques, is that the welding process, such as TIG/MIG welding, produces a large "puddle" of melted metal as a result of the inability to focus and control the heat applied from the welding tool. A large amount of heat is put into the surface of

the workpiece surrounding the weld, which causes high surface distortion, annealing of the surrounding area, and cracking of the die body and blade. The welding process also induces a large amount of residual stress in the die body and blade, which can cause cracking and corrosion. The welding process also creates large, wide beads or "globs" of welding material, requiring significant machining to shape and define the blade. Thus, the Tanaka et al. process includes a relatively messy welding process in which damage occurs to the die due to the high, uncontrolled, unfocused heat used by the welding tool, followed by a significant machining step to remove large amounts of excess cladding material, and finally a hardening treatment for making the blade suitable for use, the success of which is highly dependent on the composition of the cladding material. By virtue of using a welding process, Tanaka et al. were motivated to find a solution that would allow them to carry out the significant machining necessary for defining a functional, precise, sharp cutting edge. Their solution was to deposit soft material having an appropriate composition to enable austenite-martensite transformation by cryogenic treatment following rough and finish machining.

The present invention, as set forth in the amended claims, to the contrary uses a laser cladding technique that does not rely on martensitic transformation as the hardening mechanism for the blades. The die surface is heated and hard, wear resistant blade material is laser cladded into the heated area. Lasers have the advantage of a well-defined and localized beam by which the amount of heat/energy applied to the surface of the die can be controlled. Surface distortion, annealing and cracking can be minimized due to the localized nature of the applied heat. Little to no residual stress is induced in the die body and blade. The bond with the

die surface is also more uniform than with welding due to the high controllability of the laser cladding process.

The laser cladding technique is capable of producing small beads of material that can be accurately controlled for consistent quality and a near net shape deposit that requires far less subsequent machining to obtain the blade shape than welding processes. Thus, the fact that the material is of high hardness in the as-deposited state is of little significance with respect to machining as compared to the prior art described in Tanaka et al. due to the low excess of material that must be removed to shape the blade. Tanaka et al. must perform rough machining (substantial material removal) and finish machining (small material removal) to define the cutting edge. The shaping step in the present invention is finish machining by virtue of the near net shape deposit achieved by laser cladding. Only a small amount of material need be removed (see page 8, lines 12-20). Thus, the present invention solved the problem in a manner completely different than Tanaka et al. Rather than enabling significant material removal by machining, the present applicants eliminated the need for significant material removal. Tanaka et al. provides no teaching or suggestion for using a depositing technique other than welding.

The Murphy article relates to the art of rapid prototyping, which is fairly new technology. Rapid prototyping aids in the process of guiding a product from concept to market by automating the fabrication of a prototype part from a three-dimensional CAD drawing. The prototype part or physical model conveys more complete information about the product earlier in the development cycle. Because it is only used for purposes of visualizing what the final product will look like, there is no requirement that the part be functional. Rapid prototyping is only concerned with the shape and look of the part. Using a 3-D CAD drawing, the desired part is

spliced into horizontal cross-sections, and the part is built up section by section until a complete model is formed.

Murphy et al. disclosed their experimental work of forming a metallic prototype part by laser cladding. They deposited either cobalt or 314 stainless steel onto a substrate of like material. Thus, they were laser cladding a soft material onto the same soft material to form a shape. Nowhere in the Murphy article did they teach or suggest that the laser clad shape could be used as a blade, and in fact, because it is rapid prototyping technology, the part is not intended to be functional. There is no teaching or suggestion in Murphy et al. that the laser cladding used for rapid prototyping could be substituted for welding technology used to produce cutting blades on the surface of a die body. Thus, there is no suggestion or motivation in either reference for combining any component with the other. "Combining prior art references without evidence of such a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability—the essence of hindsight." *In re Dembiczak*, 50 U.S.P.Q.2d 1614, 1617 (Fed. Cir. 1999) (citing *Interconnect Planning Corp. v. Feil*, 227 U.S.P.Q. 543, 547 (Fed. Cir. 1985).

Moreover, both Tanaka et al. and Murphy et al. disclose depositing soft material on like or similar soft material. Neither reference teaches depositing in a near net blade shape a material that is compositionally different and of greater hardness than the base material. Applicants discovered that laser cladding can be used to deposit hard, wear resistant materials in a near net shape to form a fully functional blade on a cutting die of softer, less expensive material thereby eliminating the extensive machining required with welding techniques, limiting or eliminating the need for subsequent hardening of the blade, and avoiding cracking and the like

while gaining the benefit of less expensive base material. Tanaka et al. did not teach, suggest or recognize that a hard, wear resistant blade could be formed by near net shape deposition. Murphy et al. did not teach or suggest that laser cladding could be used to form functional parts of greater hardness than the underlying material. To take the teaching of laser deposition of soft materials to form non-functional prototype parts from Murphy et al. and substitute it for forming functional, hard cutting blades by welding techniques as desired by Tanaka et al. to arrive at the claimed invention is an exercise in hindsight that uses that which only the inventor taught against its teacher. Such hindsight-based obviousness is forbidden by current case law. *See e.g., id*; *Loctite Corp. v. Ultraseal Ltd.*, 228 U.S.P.Q. 90, 98 (Fed. Cir. 1985), *overruled on other grounds*; *W.L. Gore & Assoc. Inc. v. Garlock, Inc.*, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983). It is Applicants' position that the Examiner has failed to establish a *prima facie* case of obviousness, as there is no teaching, suggestion or motivation to combine the references in the manner in which the Examiner has done. Therefore it is submitted that claims 1-12, 20-22 and 24-27, as amended, and new claims 28-29 are allowable over the prior art of record, taken alone or an any proper combination.

In support of applicants position that the combination of references would not have been made to arrive at the present invention, and that the invention was not obvious, applicant submits a declaration from Dr. C. Rey Hsu, who is one skilled in the art of both laser and welding technologies.

In addition the amendments discussed above, claim 2 is further amended to include the limitation that the blade is built "in a single pass of said laser." Support for this amendment may be found at page 7, lines 14-20; page 15, lines 15-17; and page 16, lines 1-5.

The prior art cited by the Examiner does not disclose building a blade for a cutting die by a single pass of the laser. Thus, claim 2 is believed to be novel and unobvious over the prior art for this additional reason.

Claims 3 and 21 are further amended to include the limitation that "the die body surface is cylindrical" and the blade is built completely on the cylindrical surface. Support for this amendment may be found for example at page 10, lines 20-21. The prior art cited by the Examiner does not disclose building a blade onto a cylindrical cutting die. As attested to in paragraph 4 of Dr. Hsu's declaration, cladding onto a curved surface is more difficult that the flat surfaces disclosed in Tanaka et al. and Murphy. Thus, claims 3 and 21 are believed to be novel and unobvious over the prior art for this additional reason.

Claims 4, 21 and 24 are further amended to include the limitation that the blade material includes a carbide. Support for this amendment may be found at page 9, lines 1-2; page 12, lines 1-3; and the amendment to page 12, line 3. The prior art cited by the Examiner does not disclose building a blade for a cutting die from carbide-containing materials. Thus, claims 4, 21 and 24 are believed to be novel and unobvious over the prior art for this additional reason.

Claims 10 and 27 are further amended to include the limitation that the die body surface comprises a low grade material of less than about 60 Rockwell C hardness and the blade material comprises a carbide-containing high-grade material of at least about 60 Rockwell C hardness. Support for this amendment may be found at page 2, lines 6-7; page 8, lines 9-11; page 9, lines 1-10; page 11, line 15 to page 12, line 3; and the amendment to page 12, line 3. The prior art cited by the Examiner does not disclose building a blade of high grade, hard carbide materials onto a low grade, soft die body surface. Long life is exhibited by blades built in

accordance with the present invention at least in part due to a high content of hard carbides in the blade material. Thus, claims 10 and 27 are believed to be novel and unobvious over the prior art for this additional reason.

Claim 12 is further amended to include the limitation that the blade material is "selected from the group consisting of D2 steel, CMP10V steel, CMP15V steel and a nickel based superalloy with 30-40% volume fraction tungsten carbide." Support for this amendment may be found at page 9, lines 1-2 and page 12, lines 1-3. The prior art cited by the Examiner does not disclose building a blade from any of these particular high grade materials. Thus, claim 12 is believed to be novel and unobvious over the prior art for this additional reason.

Claims 20 and 24 are further amended to include the limitation that the cladded blade has a hardness equivalent to the final desired hardness of the blade prior to the shaping of the blade. Support for this amendment may be found at page 13, lines 10-13 and the amendment to page 13, line 13. The prior art cited by the Examiner does not disclose building the blade to the final desired hardness, followed by shaping the cladded blade. Thus, claims 20 and 24 are believed to be novel and unobvious over the prior art for this additional reason.

Claims 22 and 29 are further amended to include the limitation that the blade pattern includes intersecting blades. Support for this amendment may be found at page 5, lines 4-7 and the amendment to page 12, line 11. The prior art cited by the Examiner does not disclose laser cladding a complicated blade pattern for a cutting die. As attested to in paragraph 4 of Dr. Hsu's declaration, the complicated cutting patterns often required with rotary cutting dies results in a more difficult production process than what is taught in Tanaka et al. and Murphy. Thus,

claims 22 and 29 are believed to be novel and unobvious over the prior art for this additional reason.

Claim 28 is further amended to include the limitation that the area is heated prior to introduction of the blade material. Support for this amendment may be found at page 7, lines 7-13 where the steps of scanning and introducing are listed, but not specified with respect to the introducing being after or together with the scanning. Thus, the specification is subject to both interpretations, and claim 28 simply specifies that the scanning/heating is prior to introducing the blade material. The prior art cited by the Examiner does not disclose this feature. Thus, claim 28 is believed to be novel and unobvious over the prior art for this additional reason.

To also further support Applicants position of non-obviousness, submitted herewith are statements or accolades from customers of Bernal Technologies, specifically Mead Packaging and Shorewood Packaging, who have purchased and are using cutting dies made in accordance with the teachings of the present application, as claimed. Because of the process used, Applicants were able to focus on selection of the materials based upon their ultimate function. Because the blade can be deposited with the requisite hardness and having a composition different than the base material as appropriate for its function without regard to machining difficulties, long die life can be achieved. Distortion, cracking and tolerance problems are solved by the present invention, resulting in a cutting die that exhibits consistency, accuracy and longevity in use as a direct result of the claimed process. As set forth in the enclosed statements, the cutting dies made in accordance with the claimed invention have met a long felt need in the industry for increased blade life and have met with significant commercial success.

The Examiner has requested that copied claims 13, 15 and 16 be amended to correct antecedent basis problems that exist in the corresponding issued claims of the Islam patent from which they were substantially copied. Thus, the copied claims are amended at the specific request of the Examiner to change "base metal" to "metal base" and to change "laser beam surface" to "laser beam", and these amendments are not believed to in any way affect Applicant's right to an interference with the Islam patent.

In view of the foregoing amendments to the claims, remarks given herein, declarations and customer accolades, applicants respectfully believe this case is in condition for allowance and respectfully request allowance of the pending claims. If the Examiner believes any detailed language of the claims requires further discussion, the Examiner is respectfully asked to telephone the undersigned attorney so that the matter may be promptly resolved. The Examiner's prompt attention to this matter is appreciated.

Applicants are of the opinion that an additional fee of $9.00 is due as a result of this amendment. A check for $9.00 is submitted herewith. If any additional charges or credits are necessary to complete this communication, please apply them to deposit account no. 23-3000.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Amend specification:

Replace paragraph at page 1, line 4:

--Cutting dies are known for cutting or severing one portion of a stock material from another. For example, cutting dies are used for cutting sheets of paperboard or plastic or metal into predetermined blanks. In one form of known cutting operation, two rotary cylinders, each having small integral cutting blades extending radially from the cylindrical surface, are juxtaposed so that when rotated, the blades engage generally opposite sides of a work stock and cooperate to sever the stock into a blank, the shape of which is determined by the blade configuration. One such operation is illustrated in U.S. Patent No. [4,608,905] 4,608,895, incorporated herein by reference.--

Replace paragraph at page 11, line 20:

--In contrast, the material which is preferably introduced in powder form, to form the blade 14, may be of another material selected based on the desired parameters of the die blade. This material can be a very high grade steel, such as CMP10V or CMP15V, or a metal-ceramic composite, such as a nickel base superalloy plus 30-40% (volume fraction) tungsten carbides. These materials, by definition, include carbides, and are compositionally different and of greater hardness than base materials such as medium carbon plain steels or medium carbon low alloy steels.--

Replace paragraph at page 12, line 4:

--Presently, the deposition of powder through a powder nozzle, for example (not shown), forms a generally half ellipse cross-sectional die blade 14 as illustrated in Fig. 3. It is preferable to have the final die blade in a cross-sectional profile with edges which are somewhat tapered such as, for example, at about 25° to about 35°. Such die blade shapes, for example, are disclosed in U.S. Patent No. 4,608,895, which render the die blades suitable for contact with an opposing die for cutting a work piece inserted therebetween. Patent No. 4,608,895 also depicts blades that meet or intersect each other, which as stated above, was a problem with prior procedures.--

Replace paragraph at page 13, line 3:

--It may be desirable to further harden the die blade and this may be accomplished by any suitable technique, such as by raising the die blade material to a temperature sufficient for further strengthening that material and/or by cryogenic treating the clad tracks to eliminate the remaining austenite in the cladding material. For example, the die blade could be treated by scanning a laser beam along the die blades where the parameter of the traverse speed and intensity are appropriate to produce the optimum microstructures and hardness. It will be appreciated, however, that by virtue of the use of very high quality steel in the forming of the blade, such as those mentioned above, the optional heat treating steps for strengthening die blade may be unnecessary, because the high quality steel can inherently provide a hardness equivalent to the final desired hardness of the blade. Alternatively, localized hardening might be accomplished by induction heating.

Amend claims:

1. (Amended) A method of forming a cutting die including a die body and an integral blade extending outwardly from a surface of said die body, the method comprising the steps of:

cladding a blade material onto [a] an area of said die body surface by heating said area with a laser, introducing said blade material into the heated area, and building [to form] a blade [extending] of said blade material outwardly from said surface, wherein said blade material is compositionally different and of greater hardness than a base material forming said die body surface; and

shaping the cladded blade.

2. (Amended) A method as in claim 1 wherein said cladding step includes:

heating [an] said area of said die body surface; and

introducing said blade material into the heated area and building [a] said blade of said blade material outwardly from said surface in a single pass of said laser.

3. (Amended) A method as in claim [2] 1 wherein the die body surface is cylindrical and including heating said area with [a] said laser and introducing said blade material into the heated area to completely build said blade on said cylindrical die body surface.

4. (Amended) A method as in claim [2] 1 including introducing cladding powder comprising a carbide into the heated area for building said blade.

5. (Amended) A method as in claim [2] 1 wherein said shaping step includes shaping said blade by electrical discharge machining.

6. (Amended) A method as in claim [2] 1 wherein said shaping step includes shaping said blade by milling.

7. (Amended) A method as in claim [2] 1 wherein said shaping step includes shaping said blade by grinding.

10. (Amended) A method as in claim 1 wherein said cladding step includes:

scanning a laser beam along [a] said die body surface comprising a low grade material of less than about 60 Rockwell C hardness, in a path corresponding to a desired blade pattern;

melting said die surface along said path; and

introducing [metal] a carbide-containing high grade material of at least about 60 Rockwell C hardness into said path while heating said path to build up a die blade in said pattern.

12. (Amended) A method as in claim [10] 1 wherein said [metal] introducing step includes introducing cladding powder [into said path] selected from the group consisting of D2 steel, CMP10V steel, CMP15V steel and a nickel based superalloy with 30-40% volume fraction tungsten carbide.

13. (Amended) A process for producing a cutting die having a [base] metal base which carries a sharpened ridge extending along a predetermined path thereon, said ridge being of a composition distinct from said base, comprising the steps of;

a) moving a laser beam along said path to heat the metal base and simultaneously supplying powdered metal having a composition distinct from said base to said predetermined path via a tube moving concurrently with said laser beam so that said laser beam [surface] melts a thin layer of the metal base along said path and also melts the metal powder being delivered to the base and thus forms a band of fused metal powder along said path,

b) repeating steps a) so as to heat and melt a thin layer of the previously deposited metal along with additional metal powder to form an additional layer metallurgically bonded to the first layer, and

c) repeating step b) to produce multiple layers until a ridge of metal is formed along said path, said ridge having a substantially uniform height and width, and

d) sharpening the ridge so formed to suit it for use in cutting.

15. (Amended) A process according to claim 13, wherein after said sharpening step, said ridge is heat treated using heat [form] <u>from</u> said laser beam.

16. (Amended) A process for producing a cutting die having a metal base which carries a sharpened ridge extending along a predetermined path thereon, said ridge being of a composition distinct from said base, comprising the steps of;

a) moving a laser beam along said path to heat the [base] metal base and simultaneously supplying powdered metal having a composition distinct from said base to said predetermined path via a tube moving concurrently with said laser beam so that said laser beam [surface] melts a thin layer of the metal base along said path and also melts the metal powder being delivered to the base and thus forms a band of fused metal powder along said path,

b) repeating steps a) so as to heat and melt a thin layer of the previously deposited metal along with additional metal powder to form an additional layer metallurgically bonded to the first layer, and

c) repeating step b) to produce multiple layers until a ridge of metal is formed along said path, and

d) sharpening the ridge so formed to suit it for use in cutting.

20. (Amended) A method of forming a cutting die including a die body and an integral blade extending outwardly from a surface of said die body, the method comprising the steps of:

cladding a blade material onto [a] an area of said die body surface by heating said area with a laser, and by depositing said blade material into the heated area in multiple successive layers to form a blade extending outwardly from said surface, wherein said blade material is compositionally different and of greater hardness than a base material forming said die body surface and wherein said blade has a hardness equivalent to the final desired hardness of said blade; and

after said cladding step, shaping the cladded blade.

21. (Amended) A method of forming a cutting die comprising the steps of:

depositing a carbide-containing blade material in multiple successive layers onto a cylindrical die surface by laser cladding to form a cladded blade extending outwardly from said surface, wherein said blade material is compositionally different and of greater hardness than a base material forming said die surface; and

after said depositing step, shaping the cladded blade.

22. (Amended) A method of forming a cutting die comprising the steps of:

heating an area of a cylindrical die surface in a path corresponding to a desired blade pattern including intersecting blades;

depositing a layer of blade material [onto a die surface] into said path by laser cladding, wherein said blade material is compositionally different and of greater hardness than a base material forming said die surface;

repeating the step of depositing blade material onto a preceding layer of blade material until a blade of desired thickness is formed extending outwardly from said surface in said pattern; and

after said blade of desired thickness is formed, shaping the blade.

Claim 23 is canceled.

24. (Amended) A method as in claim [23] 22 including heating said area with [a] said laser and introducing a carbide-containing blade material into the heated area and building a blade having a hardness equivalent to the final desired hardness of said blade.

27. (Amended) A method as in claim 22 wherein said depositing steps include:

scanning a laser beam along [a] said die surface comprising a low grade material of less than 60 Rockwell C hardness, in [a] the path corresponding to [a] the desired blade pattern;

melting said die surface along said path; and

introducing [metal] a carbide containing high grade material of at least 60 Rockwell C hardness into said path while heating said path and repeating the scanning along said path to build up a die blade in said pattern.

28. (New) The method as in claim 1 wherein heating of said area is prior to said introducing said blade material.

29. (New) The method as in claim 1 wherein building said blade is in a pattern including intersecting portions.